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American Woods July 1945

Chestnut

Forest Service

U. S. DEPARTMENT OF AGRICULTURE

CHESTNUT

(Castanea dentata)

By H. S. Betts, *senior engineer, Division of Forest Products*

The beauty of the chestnut tree and its close association with the early home life of this country have made it one of our best loved eastern trees. Chestnut is valuable both as a lumber tree and for the tannin [1] in the wood, and also as a source of edible nuts. Over one-third of all the tanning extract, both domestic and foreign, consumed by the tanneries of the United States in recent years in making leather, has been derived from chestnut extract wood.[2] The wood is durable when placed under conditions favorable to decay and has been widely used in the eastern States for general construction, poles, ties, and fence posts.

There has, however, been a marked drop in the production of chestnut lumber in recent years because of the widespread destruction of the tree by chestnut blight—a fungous disease which threatens the entire stand of chestnut in the United States with extinction. The disease was brought to this country from Asia. It first attracted attenion in 1904 in New York City and has since spread throughout the entire commercial range of the tree. Every attempt to check its spread has met with failure.

Nomenclature.—Chestnut is one of the few trees of commercial importance that has but one name.

Distribution and growth.—Before chestnut was attacked by the blight it grew in commercial quantities from New Hampshire and Vermont southward and westward in Connecticut, Massachusetts, New York, Pennsylvania, and along the Appalachian Mountains to northern Georgia (fig. 1). The finest stands were in the southern Applachians. Here mature trees were generally 3 to 5 feet in diameter and 60 to 90 feet in height. Occasional specimens were found as large as 7 feet in diameter and 120 feet high. Before the blight, chestnut reproduced by stump sprouts as well as from seed. Sprout growth was fairly rapid. At 5 years of age the average height of sprouts under good conditions was about 12 feet; at 10 years, 23 feet; and at 20 years, 42 feet with a diameter of 6.8 inches.

A number of varieties of Asiatic chestnuts have been brought to the United States in the hope of obtaining a tree that would thrive despite the blight. None so far imported has proved immune, but several have considerable natural resistance to the disease. The Asiatic trees do not grow as tall or as straight as the American species but may prove suitable for extract wood, posts, etc., in addition to furnishing a supply of nuts.

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[1] An astringent used in tanning hides and skins.

[2] Other domestic sources of tannin are chestnut oak bark, eastern hemlock bark, and sumac twigs and leaves. Quebracho wood from Brazil and the adjoining countries has been the source of about three-quarters of the tannin imported into this country in recent years or about one-half of the total tannin consumed in the United States.

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Supply.—The total stand of chestnut of saw-timber size was estimated in 1924 at 19,300,000,000 board feet.[3] Of this, probably 15,000,000,000 board feet was located in the southern Appalachians where it made up about 25 percent of the total quantity of timber.

Practically all standing chestnut throughout its range has been killed by the blight, and future raw material for extract wood, timber, or other purposes must come from dead timber. It is estimated that there are about 22,000,000 long cords[4] of standing dead chestnut in the mountain sections of West Virginia, Virginia, North Carolina, Kentucky, Tennessee, and north Georgia.[5] About 14,000,000 long cords in this area are within reach of extract plants now operating and will probably last them for about 20 years. The remaining 8,000,000 long

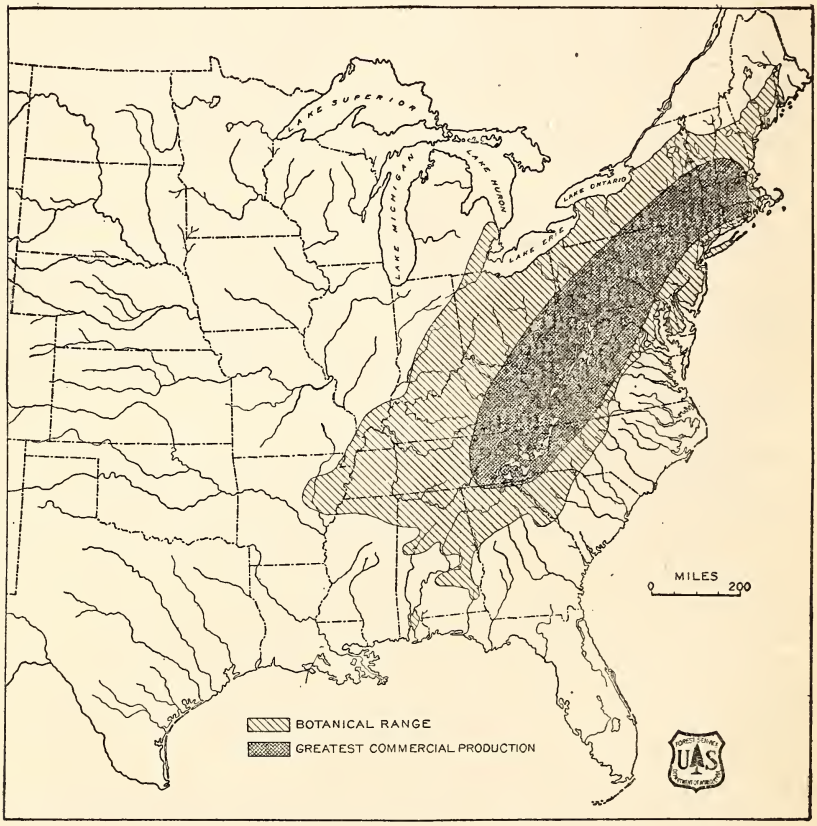

FIGURE 1.—Range of chestnut (*Castanea dentata*).

[3] *Lumber and Veneer Consumer,* October 20, 1924.

[4] Chestnut extract wood is measured in long cords—4′ x 5′ x 8′ instead of 4′ x 4′ x 8′. A long cord of dry chestnut weighs about 2,500 pounds and generally yields about 175 pounds of tannin or 700 pounds of 25 percent tanning extract. A long cord of chestnut is considered to contain 375 board feet.

[5] U. S. FOREST SERVICE, APPALACHIAN FOREST EXPERIMENT STATION. A SURVEY OF THE CHESTNUT EXTRACT INDUSTRY. Prepared for the W. P. B. March 1942. (Unpublished.)

cords, equivalent to about 3,000,000,000 board feet, offers some opportunity for new extract plants and for sawmills which compete for chestnut when it is still sufficiently sound for lumber.

Production of Tannin.—In 1923 [6] the tanneries of the United States consumed 55,301 tons of tannin made from chestnut wood. Since then the annual consumption has been less. In 1931, a year of business depression, it dropped to 24,784 tons. The average annual consumption of chestnut tannin for the period 1937–40 was 38,545 tons—equivalent to approximately 441,000 long cords [7] or approximately 165,000,000 board feet. It is probable that the increased demands for leather brought about by the war has resulted in the use of more chestnut for tannin. The consumption of chestnut tannin in each of the years 1941 and 1942 is estimated roughly at 50,000 tons, equivalent to about 571,000 long cords or approximately 214,000,000 board feet.

Lumber.—The first recorded production of chestnut lumber was 206,688,000 board feet in 1899 (fig. 2). By 1909 production had reached the maximum of 663,891,000 board feet. From 1910 to 1929 it fell irregularly to 267,917,000 board feet and in 1932 and 1933 dropped still further to 48,112,000 feet and 50,459,000 feet, respectively, due in part to the increasing effects of the blight and in part to the business depression. In 1942 production was 74,087,000 feet and in 1943, 84,740,000 board feet. The average yearly production of chestnut lumber for the 10-year period 1934–43 was approximately 84,600,000 board feet. Connecticut ranked first in the production of chestnut lumber in 1899 followed by Pennsylvania and Massachusetts. By 1904 Pennsylvania had taken the lead with West Virginia second and Connecticut third. Pennsylvania held first place until 1908, when it was displaced by West Virginia, which held the lead until 1937 [8] when North Carolina took first place. West Virginia and North Carolina each supplied about 30 percent of the chestnut lumber produced for the 10-year period 1934–43. The three leading States in 1943 (North Carolina, West Virginia, and Virginia) supplied approximately 75 percent of the chestnut lumber produced that year.

Pulpwood.—The amount of chestnut used for pulpwood in 1930 [9] was 156,300 cords. The average annual consumption of chestnut pulpwood in the years just before World War II is estimated very roughly at 75,000 cords, equivalent to 22,500,000 board feet. Since the war the consumption of chestnut pulpwood has increased markedly and in 1944 probably amounted to nearly 400,000 cords.

Poles.—The number of chestnut poles purchased in 1908 by telephone and telegraph companies, railroads, and light and power companies was 516,000. In 1923 chestnut pole purchases increased to a maximum of 808,000, which was over 25 percent of the total of all poles purchased in that year. In 1929 they dropped to 503,000 and in 1931 [10] to 187,000—about 8 percent of the total. Since then the number

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[6] The earliest year for which statistics on tannin consumption are available.
[7] See footnote 4, p. 2.
[8] Except for one year (1914), when Pennsylvania was first.
[9] The only year in which the consumption of chestnut pulpwood was compiled separately from other species.
[10] The latest year for which pole statistics (Bureau of the Census) are available.

of chestnut poles purchased has decreased markedly largely because of the blight, and chestnut has become of minor importance as a source of poles.

Railway ties.—In 1908 approximately 8,000,000 chestnut crossties were purchased for steam and electric railroads. Since then purchases of chestnut ties have decreased greatly. In 1929, 605,000 ties were bought and in 1931 [11] only 115,000. Chestnut railroad ties like chestnut poles have become of only minor importance.

In addition to the chestnut used for lumber, tannin, and pulpwood, indeterminate amounts are used for fence posts, fuel, etc. The total average annual cut of chestnut for all purposes in recent years is estimated at 325,000,000 board feet. The cut of chestnut will undoubtedly continue to decrease as the remaining blight-killed timber is used up.

Properties.—The heartwood of chestnut is grayish brown or brown and becomes darker with age. The narrow sapwood is almost white. The wood is coarse in texture, and the annual rings are made conspicuous by several rows of large distinct pores at the beginning of each year's growth.

Chestnut wood is moderately light in weight,[12] moderately hard, moderately weak, moderately low in shock-resisting ability, and lacking in stiffness. The shrinkage is moderately large, but the wood can be readily kiln dried or air seasoned and has little tendency to warp, check, or honeycomb. Chestnut is easy to work with tools and is in the group of woods most easily glued. Chestnut requires care in nailing as it splits readily. In resistance to decay, chestnut is classed among the most durable woods, such as cedars, cypress, and redwood. The wood contains from 6 to 11 percent tannin.

The blight that is rapidly exterminating chestnut is a bark disease and does not affect the properties of the wood and its suitability for lumber, provided the dead trees are cut and utilized before checking, insect attack, or decay begins.

Principal uses.—Chestnut is used principally in the manufacture of tanning extract and for lumber. It is the main domestic source of tannin for the leather industry. The extract is obtained by soaking the chipped wood in hot water and evaporating the resulting liquor to the desired concentration—generally 25 percent. A yield of about 700 pounds of 25 percent extract is obtained from a long cord of wood. Chestnut lumber is used for building purposes and in the manufacture of numerous wooden products, principally furniture, caskets, and boxes and crates. Parts of tables, desks, pianos, etc., are sometimes made of panels consisting of a chestnut core covered on both sides with thin veneers of oak, maple, birch, cherry, black walnut, or mahogany.

Other uses of chestnut include fence posts and pulp board. The spent chips from which the tannin has been extracted have come into successful use in the manufacture of fiberboard by the semichemical [13] process of pulp making.

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[11] The latest year for which statistics on railway tie consumption (Bureau of the Census) are available.

[12] The average weight of air-dry chestnut (12 percent moisture) is 30 pounds per cubic foot.

[13] The semichemical process was developed at the Forest Products Laboratory of the U. S. Forest Service. It consists of a mild digestion or cooking of the chips with chemicals followed by a mechanical reduction of the softened chips to pulp. The ordinary pulping processes are made up of three chemical processes—the sulfite, sulfate, and soda, and one mechnical or ground-wood process.

Chestnut has considerable use as firewood, party because it splits easily and ignites quickly. Its habit of snapping and crackling and throwing out sparks, however, makes it somewhat undesirable for an open fireplace.

The nuts were formerly gathered in large quantities throughout the range of the tree, to be eaten roasted or raw, but are not longer obtainable.

Table 1 shows the amounts of chestnut used in the manufacture of wooden products in 1912, 1928, 1933, and 1940. Practically all of this material was in the form of lumber. A small proportion consisted of veneer.

FIGURE 2.—Lumber production of chestnut, 1899–1943.

TABLE 1.—*Chestnut used in the manufacture of wooden products*

[Thousands of board feet]

Classes of products	1912	1928	1933	1940
Airplanes		3		
Agricultural implements	884	84		17
Boot and shoe findings				
Boxes, baskets and crating	36,217	10,734	[1] 19,258	[1] 8,746
Boxes, cigar and tobacco				
Butchers blocks				
Car construction and repair	825	961	49	5
Caskets and burial boxes	46,587	41,080	33,025	12,168
Conduits, pumps and woodpipe				
Dairy, poultry and apiary supplies	[2]	740		
Dowels and skewers				
Electrical equipment	113	25		
Firearms				
Fixtures	8,040	4,233	2,482	759
Flooring	[3]	[3]	103	17
Furniture	49,975	77,126	36,743	46,485
Handles	42			
Instruments, musical	38,125	23,801	740	1,396
Instruments, professional and scientific	367	15	1	62
Ladders				
Laundry appliances	21	343		
Machinery	1,145	113		
Matches				
Patterns and flasks	175	6	205	1,413

[1] Figures for 1933 and 1940 include chestnut used for boxes and crates by plants not classified as manufacturers of wooden products and which were not included in 1912 and 1928. The amounts included for nonmanufacturers of wooden products were as follows: For 1933, 11,640,000 board feet, and for 1940, 7,375,000 board feet.

[2] Included in "Woodenware and novelties."

[3] Included in "Sash, doors, general millwork."

TABLE 1.—*Chestnut used in the manufacture of wooden products*—Continued

Classes of products	1921	1928	1933	1940
Pencils and penholders				
Pipes, tobacco				
Playground equipment				
Plumbers woodwork	114	129	15	
Printing material	256	10		
Radio and phonograph cabinets	[4]	[4]	665	180
Refrigerators	[5] 1,509	[5] 1,498	20	
Rollers, shade and map	460			
Sash, doors, general millwork	[6] 88,703	[6] 31,690	[7] 1,148	[7] 1,572
Sewing machines	540	776	105	69
Ship and boat building	751	82	112	
Shuttles, spools, bobbins, looms				
Signs, scenery, displays		317	155	119
Sporting and athletic goods	222			2
Surgical supplies				
Tanks	15			
Toothpicks				
Toys	966	278	10	
Trunks and valises	562	90		196
Vehicles, motor	[8]	64	19	
Vehicles, nonmotor	973	78	1	
Venetian blinds				
Woodenware and novelties	21,263	388	2	
Total	298,850	194,664	94,858	73,206

[4] Included in "Furniture."
[5] Includes kitchen cabinets.
[6] Includes planing mill products such as ceiling, flooring, and siding.
[7] Planing mill products not included in 1933 and 1940 canvasses as in 1912 and 1928 except flooring which is listed separately.
[8] Included in "Vehicles, nonmotor."

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U. S. GOVERNMENT PRINTING OFFICE: 1945

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